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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,201	05/12/2006	Chris Udo Maeding	P29504	8924
7055 7590 12/21/2010 GREENBLUM & BERNSTEIN, P.L.C. 1950 ROLAND CLARKE PLACE RESTON, VA 20191			EXAMINER NGUYEN, ANDREW H	
			ART UNIT 3741	PAPER NUMBER
			NOTIFICATION DATE 12/21/2010	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/579,201	<b>Applicant(s)</b> MAEDING, CHRIS UDO	
	<b>Examiner</b> ANDREW NGUYEN	<b>Art Unit</b> 3741	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2010 and RCE.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 12-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2009 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

Art Unit: 3741

### **DETAILED ACTION**

This is a non-final rejection in response to the request for continuing examination (RCE) filed 8/19/10 and applicant's amendment filed 7/19/10.

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/19/2010 has been entered.

### **Response to Arguments**

1. Applicant's arguments filed 7/19/10 have been fully considered but they are not persuasive.

With regards to Applicant's assertion that Gradon does not disclose at least two of the first outlet opening, the at least one second outlet opening, and the third outlet openings are arranged on the front face surface, Examiner disagrees. The front face surface of Gradon is considered the aft end of the injector as shown in Fig 2. The openings 31 and 40 are each arranged on this end of the injector. Furthermore, a "surface" is defined as "the exterior or upper boundary of an object or body" (Merriam Webster). If the injector is considered the "object or body", the "surface" of the injector is not required to lie on a single plane – a surface can comprise multiple sections.

With regards to Applicant's assertion that Gradon does not disclose the swirler space comprising a tapering area in which the bores are located, Examiner disagrees. The swirler space had been tapered as it transitioned from the passage 46 to the swirlers 47 (the width of the

Art Unit: 3741

passage decreases/tapers). Further, with the inclusion of the swirlers 47, the area further decreases/tapers. Thus, the swirler space is considered a tapering area and the bores 64 are located there.

With regards to Applicant's assertion that fluid from the component feed bores of Gradon does not mix with fluid from the bores, Examiner disagrees. The component feed bores 24 feed a different passage than the bores 64 (claim 19), as do the component feed bores 24 and bores 45 (claim 25). The fluids will mix after exiting the injector.

With regards to Applicant's assertion that "Examiner is not free to designate either surface 55 or passages 27, which are elements of the burner 15, as a wall of the combustion chamber", Examiner disagrees. The burner is considered a part of the combustion chamber and as such, the walls of the burner are considered walls of the combustion chamber. The claim does not require the "walls of the combustion chamber" to define the combustion space.

With regards to Applicant's assertion that Sturgess 413 does not disclose forming a cooling liquid film layer in the combustion chamber, Examiner disagrees. The bores 17 are taught as creating a film on the surface 18. Again, the burner is considered a part of the combustion chamber and as such, walls of the burner are also considered walls of the combustion chamber. Applicant must further specify in the claims what walls the claim refers to and how they are arranged with respect to the burner.

### **Drawings**

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. *Therefore, the "swirler space comprises a tapering*

Art Unit: 3741

area (claim 14)” must be shown or the feature(s) canceled from the claim(s). The drawings show the inner surface of the outer element angled where the bores are located, but the inner element follows the same angle. Thus, the area of the passage does not actually change (a *“taper” requires a decrease in area*). No new matter should be entered.

3. The drawings (figures 1-5) are objected to because solid black shading is not permitted. See 37CFR 1.84 (m). Appropriate correction is required.

The drawings (figures 1-5) are objected to because lines, numbers and letters are not uniformly thick and well defined (poor line quality). See 37CFR 1.84 (l). Appropriate correction is required.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### **Claim Rejections - 35 USC § 102**

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 12-16, 19, 21-22, 25, 27-30, and 32-35 are rejected under 35 U.S.C. 102(b) as being anticipated by US 3,498,059 (Gradon)

#### Regarding claim 12:

Gradon teaches:

An injection element, comprising: a front face surface (Fig 2; surface including openings 40 and 31); an inner element with a first outlet opening (Fig 2; element 30 with opening 31); an outer element (element 56), comprising:

at least one second outlet opening structured and arranged for receiving and injecting fuel in a combustion space, and arranged coaxially to the first outlet opening (56 has an annular opening 40 coaxial with element 30 and receives fuel from fuel conduit 46; injects fuel into combustion space); and

third outlet openings radially beyond the at least one second outlet opening composed of bores structured and arranged for forming a cooling liquid film layer, wherein the bores are arranged along a ring, which is coaxial to the first outlet opening and the at least one second outlet opening (Fig 2; bores 64 are arranged in a ring around element 56, which is coaxial with the first outlet), wherein at least two of the first outlet opening, the at least

Art Unit: 3741

one second outlet opening and the third outlet openings are arranged on the front face surface (the first opening 31 and the second opening 40 are on the same surface).

Regarding claims 13 and 14:

Gradon teaches the outer element comprising a swirler space (slots 47 create a swirl – see col 3 lines 17-18) and a tapering area where the bores are located (see Fig 2 – the passage where the bores are located has a tapering passage width – passage 46 tapers into the swirler space 47).

Regarding claim 15:

Gradon teaches the bores arranged such that a cooling film layer and a fuel do not touch just after entry into the combustion space (see Fig 2; film layer on the outside of the outer element on surface 55 is separate from inner element fuel just after entry into the combustion space).

Regarding claim 16:

Gradon teaches an annular gap that communicates with the bores and wherein there is a swirl (annular gap 46, swirl passages 47).

Regarding claim 19:

Gradon teaches component feed bores (component feed bores 24) such that the fluid from the component feed bores mix with fluid from the bores (fluids will mix after exiting the injector).

Regarding claims 21 and 27:

Gradon teaches the outer element and inner element being coaxial (Fig 2).

Regarding claim 22:

Gradon teaches:

Art Unit: 3741

An injection element, comprising: a front face surface (Fig 2; surface including openings 40 and 31); an inner element comprising a first outlet opening (Fig 2; inner element 30, first outlet opening 31); an outer element with at least one second outlet opening structured and arranged for receiving and injecting fuel in a combustion space, and arranged coaxially to the first outlet opening (outer element 56, second outlet opening 40 coaxial with 31);

the inner element further comprising third outlet openings composed of bores structured and arranged for forming a cooling liquid film layer, wherein the bores are arranged along a ring, which is coaxial to the first outlet opening and the at least one second outlet opening to surround the first outlet opening (inner element has third outlet openings 45 which are coaxial with the first outlet and surround the outlet opening), wherein at least two of the first outlet opening, the at least one second outlet opening and the third outlet openings are arranged on the front face surface (the first opening 31 and the second opening 40 are on the same surface).

Regarding claim 25:

Gradon teaches component feed bores (component feed bores 24) such that the fluid from the component feed bores mix with fluid from the bores (fluids will mix after exiting the injector).

Regarding claim 28:

Gradon teaches:

A method of injecting fuel into a combustion chamber comprising:



Art Unit: 3741

guiding fuel into the combustion chamber through a first outlet opening (Fig 2; opening 31);

guiding fuel into the combustion chamber through a second outlet opening arranged coaxially with the first outlet opening (opening 40); and forming a cooling liquid film layer in the combustion chamber through bores arranged to coaxially surround the first outlet opening (bores 64; col 3 lines 45-54 – film of fuel on surface 55; the injectors are in a combustion chamber, thus, surface 55 is in the combustion chamber).

Regarding claim 29:

Gradon teaches the liquid film layer directed at least in part towards a combustion space inner wall (surface 55 can be considered "a combustion space inner wall" because it is a wall and it is within a combustion space).

Regarding claim 30:

Gradon teaches the bores coaxially surrounding the second outlet opening (the bores 64 are radially outward of the opening 40).

Regarding claim 32:

Gradon teaches the fuel for forming the film supplied from the same fuel supplying the second opening (both supplied from source 41).

Regarding claims 33 and 34:

Gradon teaches:

in combination with a combustion chamber, wherein the third outlet openings are structured and arranged for forming the cooling liquid film layer on a wall of the

Art Unit: 3741

combustion chamber (surface 55 can be considered a “wall of the combustion chamber” since it is inside the combustor; a film of fuel is injected onto the surface – col 3 line 50; when the openings 24 are defined as the third outlet openings, fuel flowing through passage 27 can be considered a “film”).

Regarding claim 35:

Gradon teaches each of the first opening, second opening, and third outlet openings arranged on the front face surface (Fig 2; openings 31, 40, and 64 are all located on an exterior surface of the injector). “Surface” is defined as “the exterior or upper boundary of an object or body” (Merriam Webster). The front face surface of the injection element can be considered the exterior of the inner and outer elements, and all of the openings are arranged on the exterior of the inner and outer elements, satisfying the claim limitation.

6. Claims 12, 22, 35, and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,893,255 (Grob).

Regarding claim 12:

Grob teaches:

An injection element, comprising: a front face surface (Fig 1; nozzle opening 11); an inner element with a first outlet opening (Fig 2; inner element 1 has an outlet); an outer element (the nozzle elements outside of element 1 are considered the “outer element”), comprising:

Art Unit: 3741

at least one second outlet opening structured and arranged for receiving and injecting fuel in a combustion space, and arranged coaxially to the first outlet opening (tube 14 has an outlet and is coaxial with element 1); and

third outlet openings radially beyond the at least one second outlet opening composed of bores structured and arranged for forming a cooling liquid film layer, wherein the bores are arranged along a ring, which is coaxial to the first outlet opening and the at least one second outlet opening (Fig 2; bores 10), wherein at least two of the first outlet opening, the at least one second outlet opening and the third outlet openings are arranged on the front face surface (all of the openings end on the same surface – the nozzle opening 11).

Applicant is advised that the claim does not require fuel because a fuel source is not claimed. The injector just has to be capable of injecting fuel through the second opening. Grob's injector is capable of this because the outer element is capable of carrying fluids. Also, Grob's bores are capable of forming a cooling liquid film layer because if any surface is set near the outlet of the injector, liquid is capable of being sprayed on to the surface, creating a film.

Regarding claim 22:

Grob teaches:

An injection element, comprising: a front face surface (Fig 1; nozzle opening 11); an inner element comprising a first outlet opening (Fig 2; inner element comprises outlets 1 and 3); an outer element (the nozzle elements outside of element 13 are considered the “outer element”) with at least one second outlet opening structured and arranged for

Art Unit: 3741

receiving and injecting fuel in a combustion space, and arranged coaxially to the first outlet opening (Fig 2; second outlet 14);

the inner element further comprising third outlet openings composed of bores structured and arranged for forming a cooling liquid film layer, wherein the bores are arranged along a ring, which is coaxial to the first outlet opening and the at least one second outlet opening to surround the first outlet opening (inner element has third outlet openings 3 which are coaxial with the first outlet and surround the outlet opening – see Fig 2), wherein at least two of the first outlet opening, the at least one second outlet opening and the third outlet openings are arranged on the front face surface (all of the openings end on the same surface – the nozzle opening 11).

Applicant is advised that the claim does not require fuel because a fuel source is not claimed. The injector just has to be capable of injecting fuel through the second opening. Grob's injector is capable of this because the outer element is capable of carrying fluids. Also, Grob's bores are capable of forming a cooling liquid film layer because if any surface is set near the outlet of the injector, liquid is capable of being sprayed on to the surface, creating a film.

Regarding claims 35 and 36:

Grob teaches all of the outlet openings arranged on a front face surface (see Fig 1; all of the openings are arranged at the nozzle exit).

7. Claims 28, 29 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by US 3,866,413 (Sturgess 413).

Art Unit: 3741

Regarding claim 28:

Sturgess 413 teaches a first outlet opening (opening through element 15, Fig 1), second outlet opening (passage through element 34), and bores coaxially surrounding the first opening (bores 17 surround the element 15). The bores inject fuel onto a prefilming surface 18 (i.e. they create a film layer).

Regarding claim 29:

The surface 18 is considered a combustion space inner wall.

Regarding claim 31:

The fuel source that feeds the first outlet opening also feeds the orifices 17 (source 9).

**Claim Rejections - 35 USC § 103**

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 17, 18, 23 and 24 rejected under 35 U.S.C. 103(a) as being unpatentable over US 3,498,059 (Gradon) in view of US 3,703,259 to Sturgess et al (Sturgess)

Regarding claims 17 and 18:

Gradon is silent as to the uniformity of the bores. Sturgess teaches the bores distributed uniformly about the circumference of the outer element (see Fig 7; one bore at the top, one at the bottom; can also be considered a “portion”). It would have been obvious to one of ordinary skill

Art Unit: 3741

in the art at the time of the invention to arrange the bores of Gradon uniformly about the circumference in order to provide uniform flow, as taught by Sturgess.

Regarding claims 23 and 24:

Gradon is silent as to the uniformity of the bores. Sturgess teaches the bores being uniformly distributed about an entire circumference of the inner element (see Figs 2 and 1; can also be considered a “portion”). It would have been obvious to one of ordinary skill in the art at the time of the invention to arrange the bores of Gradon uniformly about the circumference in order to provide uniform flow, as taught by Sturgess.

10. Claims 20 and 26 rejected under 35 U.S.C. 103(a) as being unpatentable over US 3,498,059

(Gradon) in view of US 5,113,647 to Shekleton (Shekleton).

Regarding claims 20 and 26:

Gradon teaches a gas turbine but fails to teach a rocket. However, it was well known in the art to use gas turbines to drive rockets in order to extend the rocket’s range, as taught by Shekleton (col 1 lines 27-33). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the gas turbine of Gradon in a rocket in order to extend the range of the rocket, as taught by Shekleton.

**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW NGUYEN whose telephone number is (571)270-5063. The examiner can normally be reached on Monday - Friday 8 am - 5 pm.

Art Unit: 3741

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cuff can be reached on (571)-272-6778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William H. Rodríguez/  
Primary Examiner, Art Unit 3741

/AN/